SECTION 3

SAFETY AND HEALTH

3.1 Introduction

3.1.1 Collection and analysis of fish samples can involve significant risks to personal safety and health (drowning, electrical shock, pathogens, etc.). While safety is often not considered an integral part of a fish sampling routine, the biologist must be aware of unsafe working conditions, hazards connected with the operation of sampling gear, boats, and other risks (Berry et al., 1983). Management should assign health and safety responsibilities and establish a program for training in safety, accident reporting, and medical and first aid treatment. The laboratory safety document and standard operating procedures (SOPs) containing necessary and specific safety precautions should be available to all persons involved in fish sample collecting and processing. Field and laboratory safety requirements for biomonitoring laboratories are found also in USEPA (1986) and Ohio EPA (1990).

3.2 General Precautions

3.2.1 Good housekeeping practice should be followed both in the field and in the laboratory. These practices should be aimed at protecting the staff from physical injury, preventing or reducing exposure to hazardous or toxic substances, avoiding interferences with laboratory operations, and producing valid data.

3.2.2 Field personnel and sampling crew must have mandatory training in Red Cross first aid, cardiopulmonary resuscitation (CPR), boating and water safety, field survey safety (weather conditions, personal safety, and vehicle safety), presurvey safety requirements (equipment design, equipment maintenance, reconnaissance of survey area), and electrofishing safety (Ohio EPA, 1990). It is the responsibility of the group safety officer or field sampling leader to ensure that the necessary safety courses are taken by all field personnel and that all safety policies and procedures are followed.

3.2.3 Operation of fish sampling devices involves potential hazards that must be addressed by the individuals using the equipment. Electrofishing equipment should be operated carefully. Electrofishing should always be done with at least three individuals, and all safety procedures must be followed. Persons using these devices should become familiar with the hazards involved and establish appropriate safety practices prior to using them (Reynolds, 1983; Ohio EPA, 1990). **Note:** Individuals involved in electrofishing must be trained by a person experienced in this method or by attending a certified electrofishing training course (See Section 4, Sample Collection for Analysis of the Structure and Function of Fish Communities, Subsection 4.3 Electrofishing and Ohio EPA, 1990).

3.2.4 Field personnel should be able to swim. Waders should always be worn with a belt to prevent them from filling with water in case of a fall. The

use of a life jacket is advisable at dangerous wading stations if one is not a strong swimmer because of the possibility of sliding into deep water.

3.2.5 Individuals sampling with scuba gear must be certified. The hazards of sampling with scuba gear are sufficiently great that certification is mandatory.

3.2.6 Many hazards lie out of sight in the bottoms of lakes, rivers and streams. Broken glass or sharp pieces of metal embedded in the substrate can cause serious injury if care is not exercised when walking or working with the hands in such environments. Infectious agents and toxic substances that can be absorbed through the skin or inhaled may also be present in the water or sediment.

3.2.7 Personnel must consider and prepare for hazards associated with the operation of motor vehicles, boats, winches, tools, and other incidental equipment. Boat operators should be familiar with U.S. Coast Guard rules and regulations for safe boating contained in a pamphlet, "Federal Requirements for Recreational Boats," available from your local U.S. Coast Guard Director or Auxiliary, or State Boating Official (U.S. Coast Guard, 1987).

3.2.8 Prior to a sampling trip, personnel should determine that all necessary equipment is in safe working condition and that the operators are properly trained to use the equipment.

3.2.9 Safety equipment and first aid supplies must be available in the laboratory and in the field at all times. All motor vehicles and boats with motors must have fire extinguishers, boat horns, cushions, and flares or communication devices.

3.3 Safety Equipment and Facilities

3.3.1 Necessary and appropriate safety apparel such as waders, lab coats, gloves, safety glasses, and hard hats must be available and used in accordance with the project safety plan.

3.3.2 First aid kits, fire extinguishers and blankets, safety showers, and emergency spill kits must be readily available in the laboratory at all times.

3.3.3 A properly installed and operating hood must be provided in the laboratory for use when working with carcinogenic chemicals (e.g., formaldehyde) that may produce dangerous fumes.

3.3.4 Communication equipment and posted emergency numbers must be available to field personnel and those working in mobile labs in remote areas for use in case of an emergency.

3.3.5 Facilities and supplies must be available for cleaning of exposed body parts that may have been contaminated by pollutants in the water. Soap and an adequate supply of clean water or ethyl alcohol, or equivalent, should be suitable for this purpose.

3.4 Field and Laboratory Operations

3.4.1 At least two persons (three persons for electrofishing) must be present during all sample collection activities.

3.4.2 All surface waters should be considered potential health hazards due to toxic substances or pathogens and exposure to them should be minimized as much as possible. Exposed body parts should be cleaned immediately after contact with these waters.

3.4.3 All electrical equipment must bear the approval of Underwriters Laboratories and must be properly grounded to protect against electric shock.

3.4.4 Use a winch for retrieving large fish nets, trawls, etc., for samples collected with heavy sampling devices, and use care in lifting heavy items to prevent back injury.

3.4.5 Persons working in areas where poisonous snakes may be encountered must check with the local Drug and Poison Control Center for recommendations on what should be done in case of a bite from a poisonous snake. If local advice is not available and medical assistance is more than an hour away, carry a snake bite kit and be familiar with its use. Any person allergic to bee stings or other insect bites must take proper precautions and have any needed medications handy.

3.4.6 Personnel participating in field activities on a regular or infrequent basis should be in sound physical condition and have a physical exam annually or in accordance with Regional or State Safety requirements.

3.4.7 All field personnel should be familiar with the symptoms of hypothermia and know what to do in case symptoms occur. Hypothermia can kill a person at temperatures much above freezing (up to 10^{0}C or 50^{0}F) if he or she is exposed to wind or becomes wet.

3.5 Disease Prevention

3.5.1 Unknown pollutants and pathogens in surface waters and sediments should be considered potential health hazards and exposure to them kept to a minimum.

3.5.2 Personnel who may be exposed to water known or suspected to contain human or animal wastes that carry causative agents or pathogens must be immunized against tetanus, hepatitis, typhoid fever, and polio. Field personnel should also protect themselves against the bite of deer or wood ticks because of the potential risk of acquiring pathogens that cause Rocky Mountain spotted fever and Lyme disease.

3.6 Literature Cited

Berry, C.R. Jr., W.T. Helm, and J.M. Neuhold. 1983. Safety in fishery field work. *In*: Nielsen, L.A., and D.L. Johnson (eds.). Fisheries Techniques, American Fisheries Society, Bethesda, MD. pp. 43-60.

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